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SUMMARY

The *Coccinellidae* family has over 3.000 species all over the world. In Europe, aproximatelly 100 species could be met (Iperti, 1974). In Romania the most species (60%) were highlighted in Transilvania by Petri (1912). In Moldova, Cirdei and al. (1963) descriebed 37 species. These are small or middle insects with the dorsal-convex part. The wings are glossy, yellow or red, with black or mixed black and white, yellow or red. Vivid colours warn about their toxicity. Most of coccinelide species are predators of different species of *Homopteras*, but they could accept as feed a variable palette of insects. Aphidophageal coccinelids are part of subfamily Coccineliina, but aphidophagy is presented also for the members of subfamilies *Scymninae* and *Chilocorinae* (Frazer,1988). *Coccinella septempunctata* L. Detects aphids from a distance of 1 cm. These predators feel the smell that comes from the aphids, but also alarm pheromones. From the efficiency of catching aphids point of view, there are differences between development stages of coccinelids. Big larvae (L4) are more efficient than young larvae (L1-L2), adults being less efficient than big larvae (Frazer, 1988). Coccinelids feed themselves also with parasitic individuals, reducing in this way the rate of parasitism and of populations of aphids (Frazer, 1988). The behaviour of search, voracity, the number of species of Coccinellidae and temperature determine their effiency.

The doctoral thesis ” Researches regarding the fauna of coccinelide (*Coleoptera-Coccinellidae*) within some agricultural crops from NE part of Moldova ”approaches the study of Fauna of coccinelide (*Coleoptera-Coccinellidae*) sampled from the agricultural crops within two stations from Iasi county: Adamachi and Ezareni, during two years of research (2017 and 2018). This scientific paper has a total of 199 pages and according to actual regulations is made by two parts: The first part entitled ”The current state of research” has a number of 14 pages, 2 tables and 1 figure and the second part entitled ”Own researches” has 181 pages and includes 121 tables and 121 figures.

The first part includes two chapters, thus: the first chapter has information from the speciality literature worldwide and also in Romania regarding the study of *Coccinellidae* and the second chapter is about the natural framework of Iași county where the researches have been carried out, here is a short meteorological characterization of the two years of researches (2017 and 2018).

The second part includes three chapters:

The third chapter presents the description of the crops took into the study, the goal, the objectives of reseaches, methods of entomological material sampling, and also the origin of researches material and the realization of the experience, methods of analyzis and the dates interpretation.

A. Dates of entomofauna samplings of Coleopteras by using the both methods in 2017 and 2018

a. Dates of samplings by using Barber soil traps method in 2017

Within Adamachi station,in 2017, by using Barber soil traps method, a number of 15 periodical samplings of biological material was carried out at the following crops: apple, maize and cabbage, at the following dates: 03.06, 07.06, 13.06, 20.06, 30.06, 05.07, 09.07, 14.07, 20.07, 25.07, 01.08, 07.08, 14.08, 21.08, 01.09.

Within Ezareni station, in 2017, by using Barber soil traps method, a number of 15 periodical samplings of biological material was carried out at the following crops: wheat and maize, at the following dates: 05.06, 09.06, 14.06, 20.06, 25.06, 01.07, 07.07, 14.07, 20.07, 28.07, 03.08, 10.08, 17.08, 23.08, 02.09.

b. Dates of samplings by using Barber soil traps method in 2018

Within Adamachi station, in 2018, by using Barber soil traps method, a number of 15 periodical samplings of biological material was carried out at the following crops: apple, maize and cabbage, at the following dates: 07.05, 14.05, 22.05, 30.05, 02.06, 07.06, 14.06, 21.06, 28.06, 04.07, 11.07, 18.07. 23.07, 01.08, 05.08.

Within Ezareni station, in 2018, by using Barber soil traps method, a number of 15 periodical samplings of biological material was carried out at the following crops: wheat and maize, at the following dates: 30.04, 03.05, 07.05, 12.05, 17.05, 22.05, 30.05, 05.06, 11.06, 16.06, 23.06, 28.06, 05.07, 11.07, 18.07.

c. Dates of samplings by using entomological net method in 2017

Within Adamachi station,in 2017, by using entomological net method, a number of 15 periodical samplings of biological material was carried out at the following crops: apple, cherry, peach and vineyard crops, at the following dates: 07.06, 13.06, 20.06, 25.06, 01.07, 07.07, 13.07, 18.07, 22.07, 28.07, 02.08, 08.08, 13.08, 20.08, 25.08.

Within Ezareni station, in 2017, by using entomolgical net method, a number of 15 periodical samplings of biological material was carried out at the following crops: wheat and maize, at the following dates: 06.06, 12.06, 16.06, 23.06, 27.06, 07.07, 14.07, 21.07, 28.07, 03.08, 08.08, 13.08, 20.08, 06.09, 13.09.

d. Dates of samplings by using entomological net method in 2018

Within Adamachi station,in 2018, by using entomological net method, a number of 9 periodical samplings of biological material was carried out at the

following crops: apple, cherry, peach and vineyard crops, at the following dates: 21.05, 28.05, 04.06, 11.06, 18.06, 26.06, 03.07, 10.07 and 18.07.

Within Ezareni station, in 2018, by using entomolgical net method, a number of 13 periodical samplings of biological material was carried out at the following crops: wheat and maize, at the following dates: 12.05, 16.05, 22.05, 29.05, 05.06, 12.06, 19.06, 26.06, 04.07, 10.07, 17.07, 24.07 and 28.07.

B. Goal and objectives of researches

The goal of researches was that to identify coccinelide useful fauna (*Coleoptera-Coccinellidae*) from the crops taken into the study within two stations from Iasi county: Adamachi and Ezareni.

The proposed goals were:

- knowledges about current state of research regarding the coccinelide useful fauna from the crops taken into the study;
- identification of useful coccinelide species;
- comparative study of coccinelide useful fauna sampled at the studied crops in 2017 and 2018 within the two stations.

The carried out tasks in order to reach the objectives were:

- bibliographyc study of of speciality literature nationally and worldwide; - making of work sketch and mounting the traps in the experimental fields;
- making observations within the field;
- sampling of biological material by the mean of two methods: Barber soil traps and entomological net;
- preparation of material in order to identify useful coccinelide species;
- analyze of sampled material and determination of coccinelide species;
- distribution of harvested samples from Coleoptera order on species;
- establishing the structure, dynamic and abundance of coccinelide fauna (*Coleoptera-Coccinellidae*);
- calculation of the main ecological indices: abundance (A), dominance (D), constance (C), and indice of ecological semnification (W);
- following the dynamic of coccinelide fauna (*Coleoptera-Coccinellidae*) for each crop and station;
- comparison of stations in order to establish the abundance of coccinelide species;
- comparison of achieved results on stations, sampling methods and within the two years of researches.

C. Sampling methods of the entomological material

a. Barber soil traps method

Barber soil traps consist of plastic boxes of 500 ml which have a diameter of 10 cm and a height of 8 cm. Inside of them, a solution consisting of powder in water has been placed in proportion of 16%. The traps have been placed at the ground level. The pits have been done by the mean of a spud, and

introduction of traps was carrefully carried out, so that the traps margins being at the ground level, on this line the insects easily enter inside the traps.

In order to realise the researches regarding coccinelide fauna (*Coleoptera-Coccinellidae*) from the crops taken into the study, the biological material was sampled in 2017 and 2018 within the two stations from Iasi county: Adamachi and Ezareni. In order to carry out the experiences, the way of work in case of using the Barber soil traps was as follows:

Adamachi station:

Mounting of traps was realised at a distance of 5 m one from another.

A number of 6 traps was mounted for each of the following crops: apple, maize and cabbage within each of two years of researches. The number of collected samples for each crops was of 90 (6 traps x 15 samples). The total number of samples was of 270/year. In 2017, the traps were mounted at May 30th, the first sampling being at June 3rd. In 2018, the traps for sampling the coccinelide fauna were mounted at May 1st, the first sampling being at May 7th.

Ezareni station:

Mounting of traps was realised at a distance of 5 m one from another.

A number of 6 traps was mounted for each of the following crops: wheat and maize within each of two years of researches. The number of collected samples for each crops was of 90 (6 traps x 15 samples). The total number of samples was of 180/year. In 2017, the traps were mounted at May 28th, the first sampling being at June 5th. In 2018, the traps for sampling the coccinelide fauna were mounted at April 26th, the first sampling being at April 30th. In each of this two stations, the biological material was sampled at an interval of 4-10 days, from april to september. Inside the Barber traps a solution consisting of powder and water in proportion of 16% was added. This solution has an influence on the traps efficiency, being a good conservant in order to prevent the maceration of sampled individuals. The establishment of a biotop dominance can be realised by mounting of a minimal number of 10 traps for sampling of all species categories. The number of used soil traps was established depending on sampling place and crop, this having the goal to achive real informations. The content of each trap was placed on a gauze sieve in order to separated the insects from the fixative liquid. The gauze containing each sample was introduced in labeled bags, the label having the following informations: station, crop, date of sampling and number of trap. In order to keep the elasticity of insects, and to anesthetize the alive insects, sanitary alchol was used.

After each sampling, the traps were introduced again into the soil, the fixative liquid being replaced. The sampled material was brought into the laboratory , and the insects were determined and identified.

b. Entomological net method

Is the easiest and most used insects sampling methods. This method consists of "lawn'', namely a fix number of moves from right to left side over the place where the insects can be found (20 lawns at a surface of 25 meters). Entomological net is a fitment which has a cercal-shaped metal frame with a diameter of 30 cm that has attached a frustconical net and a stem with a lenght of 1 m. On each from the two stations and each of two years of researches, after catching, the biological material was taken out and moved into the entomological boil in that a piece of cotton wool and sanitary alcohol. The boils were labeled, on each label being added being written the following informations: station, crop and date of sampling. The sampled material was brought into the laboratory, and the insects were counted and identified.

D. Analyze methods and interpretation of achieved results

Determination of entomological material has been realised in the Laboratory of Entomology belonging to "Ion Ionescu de la Brad'' University of Iasi by the mean of German Determination "Fauna germanica " (Reiter vol I, II, III, IV.V), Determination book written by Panin. Analyze and interpretation of dates was realised by the mean of indices: abundance (A), dominance (D) and ecological semnification indices (W).

The fourth chapter includes achieved results and their interpretation, thus:

a. Results achived in the Adamachi station

Structure, abundance and dynamic of coccinelide (*Coleoptera-Coccinellidae*) entomofauna sampled in 2017 within apple orchard, maize and cabbage crops by the mean of Barber soil traps

- it was identified a total number of 12 species with 985 samples, the biggest number of identified samples (409) being within cabbage crop;
- the most abundant species was *Coccinella septempunctata* with a total number of samples within these three crops of 367;
- the biggest number of samples was identified within the maize crop (128 samples), followed by cabbage crop (122 samples) and apple orchard (117 samples). Dominance for this species has varied between 29,82 (cabbage crop) and 42.545 (apple orchard);
- the total number of samples of *Adalia bipunctata* species was 201, the biggest number of samples (87) being identified within the cabbage crop. Dominance for this species has varied between 18,909 (apple crop) and 21,3 (cabbage crop);
- the total number of samples of *Propylaea quatordecimpunctata* was 162, the biggest number of samples (74) being identified within the cabbage crop.

-dominance for this species has varied between 11,9 (maize crop) and 18.909 (apple orchard).

- the total number of samples of *Propylaea quatordecimpunctata* was 162, the biggest number of samples (74) being identified within the cabbage crop. - dominance for this species has varied between 11,9 (maize crop) and 18.909 (apple orchard).

Structure, abundance and dynamic of coleoptera (*Coleoptera-Coccinellidae*) entomofauna sampled in 2018 within apple orchard, maize and cabbage crops by the mean of Barber soil traps

- it was identified a total number of 12 species with 490 samples, the biggest number of samples (187) being identified within cabbage crop;

- the most abundant species was *Coccinella septempunctata* with a total number for these three crops of 187;

- the biggest number of samples (86) was identified within the cabbage crop, followed by maize crop (56 samples) and apple orchard (45 samples);

- dominance for this species has varied between 26,31% (apple orchard) and 45,99 (cabbage crop);

- total number of samples of *Propylaea quatordecimpunctata* species was 99, the biggest number of samples (53) being identified within the apple orchard ; - dominance for this species has varied between 13,64% (maize crop) and 30,99% (apple orchard);

- the total number of samples *Adalia bipunctata* species was 77, the biggest number of samples (27) being identified within the apple orchard;

- dominance for this species has varied between 12,83% (cabbage crop) and 19,69% (maize crop).

Structure, abundance and dynamic of coccinelide (*Coleoptera-Coccinellidae*) fauna sampled in 2017 within apple, cherry, peach and vineyard orchards by the mean of entomological net

- it was identified a total number of 21 coccinelide species with 1875 samples;

- the most abundant species was *Coccinella septempunctata*. From a total of 405 samples, the biggest number of samples (147) was identified within cherry orchard;

- from a total number of 438 samples identified for species *Propylaea quatordecimpunctata*, the biggest number of samples (147) was identified within vineyard orchard;

- for the *Adalia bipunctata* species, from a total of 321 samples, the biggest number of samples (111) was identified within peach orchard.

Structure, abundance and dynamic of coccinelide (*Coleoptera-Coccinellidae*) entomofauna in 2018 within apple, cherry, peach and vineyard by the mean of entomological net

- it was identified a total number of 10 species of coccinelide with 756 samples;

- the most abundant species was *Adalia bipunctata*. From a total of 210 samples, the biggest number of samples (66) was identified within cherry orchard;

- from a total of 198 samples identified for species *Adonia variegata* species,, the biggest number of samples (75) was identified within cherry orchard;

- for the *Coccinella septempunctata* species, from a total of 90 samples, the biggest number of identified samples (36) was within the vineyard orchard.

The fifth chapter includes the conclusions.

b.Results achieved in Ezareni station

Structure, abundance and dynamic of coccinelide (*Coleoptera- Coccinellidae*) fauna sampled in 2017 within wheat and maize crops by the mean of Barber soil traps

- it was identified a total number of 11 species with 573 samples for these two studied crops, the biggest number of identified samples was within the maize crop (312);

- the most abundant species was *Propylaea quatordecimpunctata* with a total number of 177 samples within these two studied crops. The biggest number of samples (105) was identified within maize crop, dominance being of 33,6%;

- for the *Coccinella septempunctata* species the total number of identified samples was of 171, the biggest number of samples (92) being identified within the wheat crop, dominance being of 35,2%;

- for the *Harmonia axyridis* species the total number of identified samples was of 87 samples, the biggest number being identified within maize crop (51 samples), dominance being of 16,3%.

Structure, abundance and dynamic of coccinelide (*Coleoptera-Coccinellidae*) fauna sampled in 2018 within wheat and maize crops by the mean of Barber soil traps

- it was identified a total number of 14 species with 285 samples within these two studied crops, the biggest number of samples (154) being identified within maize crop;

- the most abundant species was *Coccinella septempunctata* with a total number of 93 samples within these two studied crops. The biggest number of samples (68) was identified within maize crop, dominance being of 44,15%;

- for the *Propylaea quatordecimpunctata* species, the total number of identified samples was of 50, the biggest number of samples (36) being identified within maize crop, dominance being of 23,37%;

Structure, abundance and dynamic of coccinelide (*Coleoptera-Coccinellidae*) fauna sampled in 2017 within wheat and maize crops by the mean of entomological net

- it was identified a total number of 15 coccinelide species with 389 samples, the biggest number of samples (196) being identified within the wheat crop;

- the species with the highest abundance were: *Coccinella septempunctata* (140 samples), the biggest number (113 samples) being registered within the wheat crop, Harmonia axyridis (64 samples), the biggest number (34) being registered within maize crop and Adalia bipunctata (53 samples), the biggest number (33) being registered within maize crop.

Structure, abundance and dynamic of coccinelide (*Coleoptera-Coccinellidae*) fauna sampled in 2018 within wheat and maize crops by the mean of entomological net

- it was identified a total number of 12 species with 365 samples, the biggest number of samples (192) being identified within the maize crop;

- the species with the highest abundance were: *Adalia bipunctata* (87samples-the biggest number being of 51-wheat crop), *Adonia variegata* (81 samples-the biggest number being of 57-maize crop) and *Coccinella septempunctata* (62 samples, the biggest number being of 32-wheat crop).

At the end of thesis is presented the summary of achieved result after sampling coccinelide (*Coleoptera-Coccinellidae*) fauna, and also a short description and abundance of representative species of coccinelide sampled during 2017 and 2018 years of research.

The fifth chapter includes the conclusions which result from the reseaches that have been done.

Within the Adamachi station, by using the Barber soil traps method, by analysing the coccinelide (*Coleoptera-Coccinellidae*) fauna during the 2017 and 2018 years of researches, it could be seen that the biggest number of samples belongs to *Coccinella septempunctata* species (554), the highest abundance of this species being identified within maize crop in 2017 (128 samples).

Within the Ezăreni station, by using the Barber soil traps method, by analysing the coccinelide (*Coleoptera-Coccinellidae*) fauna during the 2017 and 2018 years of researches, it could be seen that the biggest number of samples belongs to *Coccinella septempunctata* species (264), the highest abundance of this species being identified within wheat crop in 2017 (92 samples).

Within the Adamachi station, by using the entomological net method, by analysing the coccinelide (*Coleoptera-Coccinellidae*) fauna during the 2017 and 2018 years of researches, it could be seen that the biggest number of samples belongs to *Adalia bipunctata* species (531), the highest abundance of this species being identified within peach orchard in 2017 (111 samples).

Within the Ezăreni station, by using the entomological net method, by analysing the coccinelide (*Coleoptera-Coccinellidae*) fauna during the 2017 and 2018 years of researches, it could be seen that the biggest number of samples belongs to *Coccinella septempunctata* species (202), the highest abundance of this species being identified within wheat crop in 2017 (113 samples).

Thus, during the researches period, by using the both sampling methods, a number of 27 coccinelide species was identified (5718 samples).

The identified species were: *Coccinella septempunctata* (1515 samples), *Adalia bipunctata* (1023 samples), *Propylaea quatordecimpunctata* (937 samples), *Harmonia axyridis* (549 samples), *Coccinella 10-punctata* (398 samples), *Adonia variegata* (314 samples), *Coccinella 10-punctata var.subpunctata* (176 samples), *Anatis ocellata* (93 samples), *Hippodamia variegata* (89 samples), *Coccinella hieroglyphica* (135 samples), *Coccinella var.5-punctata* (76 samples), *Calvia decemguttata* (71 samples), *Scymnus suturalis* (51 samples), *Platynaspis luteorubra* (45 samples), *Nephus quadrimaculatus* (42 samples), *Exochomus quadripustulatus* (42 samples), *Chilocorus renipustulatus* (39 samples), *Halyzia 22-punctata* (26 samples), *Halyzia 14-punctata* (23 samples), *Scymnus interruptus* (23 samples), *Coccinella var.6 punctata* (18 samples), *Coccinella magnifica* (9 samples), *Stethorus punctillum* (9 samples), *Hippodamia 13-punctata* (6 samples), *Subcoccinella 24-punctata* (3 samples), *Harmonia quadripunctata* (3 samples) and *Coccinella conglobata* (3 samples).

Species with the biggest number of samples were:

1. *Coccinella septempunctata* (1515 samples). This species was sampled within the both stations during the two years of researches, by using the both researches methods. The highest abundance of this species was registered in 2017 within Adamachi station, by using the entomological net method (405 samples);

.2. *Adalia bipunctata* (1023 samples). This species was sampled within the both stations during the two years of researches, by using the both researches methods. The highest abundance of this species was registered in 2017 within Adamachi station, by using the entomological net method (321 samples);

3. *Propylaea quatordecimpunctata* (937 samples). This species was sampled within the both stations during the two years of researches, by using the both researches methods (exception being the 2018 year of researches within Adamachi station when using the entomological net). The highest abundance of this species was registered in 2017 within Adamachi station, by using the entomological net method (438 samples);

4. *Harmonia axyridis* (549 samples). This species was sampled within the both stations during the two years of researches, by using the both researches methods (exception being the 2018 year of researches within Adamachi station when using the entomological net). The highest abundance of this species was registered in 2017 within Adamachi station, by using the entomological net method (189 samples);

5. *Coccinella 10-punctata* (398 samples). This species was sampled within the both stations during the two years of researches, by using the both

researches methods during the two years of researches methods. The highest abundance of this species was registered in 2017 within Adamachi station, by using the entomological net method (105 samples);

6. *Adonia variegata* (314 samples). This species was sampled within the both stations during the two years of researches, by using the both researches methods (exception being 2017 within Ezăreni station when using Barber traps method). The highest abundance of this species was registered in 2018 within Adamachi station, by using the entomological net method (198 samples).